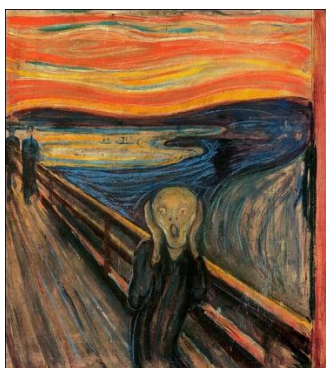


Fact or Fiction?: Smog Creates Beautiful Sunsets

RED SKIES AT NIGHT: May be a warning of heavy particulate pollution rather than a storm coming.



(1) _____ urban legend, air pollution (2) _____ the beauty of a sunset. *Be it the azure of high noon* or the orange glow of dusk, the colors of the sky (3) _____ sunlight interacting with molecules in the air, primarily nitrogen and oxygen, which cause it to be deflected in all directions, a phenomenon called Rayleigh scattering.

During the day, when the sun is directly overhead, light travels only a short distance through a (4) _____ section of the atmosphere. But as the sun edges toward the horizon, the light must travel (5) _____ longer paths and is scattered by more air molecules. By the time it (6) _____ the end of this journey (our eyes). What remains are the warmer hues of yellow, orange and red, which blend into a yellowish-orange sunset.

Yet, scattering by nitrogen and oxygen can only explain how sunsets can be orange and perhaps reddish, not how the sky can blush blood red. "In an atmosphere with no junk at anytime, you'll never get a sunset that would make someone with normal color (7) _____ say, 'Wow that's red!'" says Craig Bohren, professor of meteorology at Pennsylvania State University.

To get a red sky, you need aerosols, explains A. R. Ravishankara, director of chemical sciences at the NOAA Earth System Research Laboratory in Boulder, Colo. Aerosols are solid or liquid particles (8) _____ in the air that originate from both natural processes and human activity. Natural aerosols come from forest fires, mineral dust kicked up by sandstorms, sea spray and volcanic eruptions, among other things. Following the 1883 eruption of Indonesia's Krakatoa, brilliant sunsets (9) _____ around the world, one of which is said to have inspired Norwegian artist Edvard Munch's painting, *The Scream*.

But "in a large city, you can ignore natural aerosol products for the most part" because the number of aerosols produced by human activity far exceeds natural sources, says Sergey Nizkorodov, a chemist at the University of California, Irvine. Most particles suspended above cities scatter radiation, preferentially removing the cooler violets and blues in the spectral palette and enhancing the red, Nizkorodov says. (10) _____, these particles scatter light much the same as do oxygen and nitrogen molecules.

"Molecules and small particles scatter the same way as long as the particle is sufficiently small," Bohren says. Many man-made aerosols are small enough to meet this criterion, so they (11) _____ to the deep crimson sunsets of Los Angeles and other polluted cities across the globe.

However, "at some point, the air pollution is so bad, and the sky is so saturated, you don't even see the sun (12) _____ anymore," Nizkorodov says. For example, the sunset can appear bright but washed out when large numbers of big particles accumulate in the troposphere, the layer of the atmosphere closest to the ground.

"Particles of any kind, even much smaller than the wavelength of visible light, will, as a rule, make the sky brighter but at the expense of its purity of color," Bohren says, noting that the effect is more pronounced when there is a high concentration of large aerosols. So, although aerosols may make a sunset red, excess pollution will also dampen the (13) _____ sunset experience. (14) _____, the transition from day to night might be a whole lot peachier—and healthier—without all that atmospheric flotsam.

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|----|------------------------|-----------------------|----------------------|-------------------------|
| 1 | A due to | B according to | C in terms of | D as for |
| 2 | A enhances | B enlarges | C increases | D expands |
| 3 | A result in | B result from | C give rise to | D bring about |
| 4 | A particularly thinner | B extensively thinner | C relatively thinner | D significantly thinner |
| 5 | A increasingly | B more | C much more | D considerably |
| 6 | A achieves | B gains | C obtains | D reaches |
| 7 | A impression | B sight | C overview | D vision |
| 8 | A gathered | B suspended | C assembled | D dispersed |
| 9 | A appeared | B occurred | C set about | D came true |
| 10 | A To some extent | B In practice | C In this sense | D As a result |
| 11 | A give | B contribute | C provide | D supply |
| 12 | A commonly | B entirely | C clearly | D brightly |
| 13 | A ultimate | B general | C overall | D previous |
| 14 | A Therefore | B However | C In fact | D Indeed |